

WHAT IS CLAIMED IS:

1. Substantially purified BIN1 polypeptide, wherein said polypeptide has receptor kinase activity and is a receptor for brassinosteroids.
- 5 2. The polypeptide of Claim 1, wherein said polypeptide has a molecular weight of approximately 130 kD, as determined by SDS-PAGE.
3. The BIN1 polypeptide of Claim 1, wherein the amino acid sequence of said protein is substantially the same as the amino acid sequence set forth in SEQ ID NO: 2.
- 10 4. The BIN1 polypeptide of Claim 1, wherein the polypeptide comprises the amino acid sequence set forth in SEQ ID NO: 2.
5. The BIN1 polypeptide of Claim 3, wherein amino acid residue 611 is changed from glycine to glutamic acid.
- 15 6. The BIN1 polypeptide of Claim 1, wherein said receptor kinase activity is activated by brassinoloide.
7. The BIN1 polypeptide of Claim 1, wherein said polypeptide has a brassinosteroid binding affinity of approximately  $K_d = 7.4 \pm 0.9$  nM to  $10.8 \pm 3.2$  nM.
8. The BIN1 polypeptide of Claim 1, wherein the Alanine at position 1031 is replaced by Threonine.
- 20 9. The BIN1 polypeptide of Claim 1, wherein the Threonine at position 740 is replaced by an Isoleucine.
10. The BIN1 polypeptide of Claim 1, wherein said polypeptide is from *Arabidopsis thaliana*.
11. A substantially purified peptide comprising approximately 70 amino acids of the BIN1 extracellular domain, wherein said peptide binds to brassinosteroids.
- 25 12. The peptide of Claim 11, wherein said peptide has an amino acid sequence corresponding to about amino acid residue 588 to 649 of SEQ ID NO: 2.